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Serhan

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(54) **RETRACTABLE SIDE RAIL MOUNTING ASSEMBLY**

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A61G 7/05 (2006.01)

(52) **U.S. Cl.**
CPC ***A61G 7/0507*** (2013.01); *A61G 2007/0518* (2013.01); *A61G 2007/0519* (2013.01); *A61G 2203/12* (2013.01)

(58) **Field of Classification Search**
CPC A47C 21/08; A47C 21/00
USPC 5/430, 428, 425, 424
See application file for complete search history.

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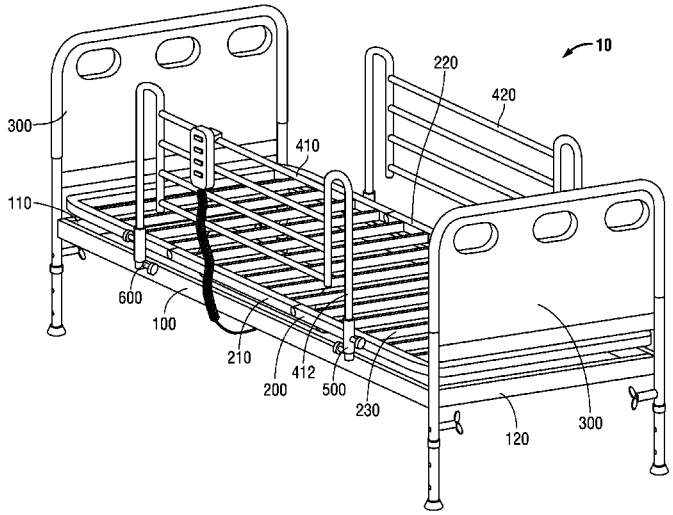
(57) **ABSTRACT**

A patient care bed includes a frame, a side rail, and a side rail mounting assembly. The side rail mounting assembly includes a rail-receiving member defining a passageway configured to releasably receive the side rail and a support rod fixedly engaged to and extending from the rail-receiving member. The support rod is slidable relative to the frame between a storage position, wherein the rail-receiving member is disposed within the frame, and a use position, wherein the rail-receiving member is disposed outside the frame. The support rod is rotatable relative to the frame between a storage orientation, wherein the rail-receiving member is horizontal, and a use orientation, wherein the rail-receiving member is vertical. The side rail mounting assembly is transitionable between a storage condition, corresponding to the storage position and orientation of the support rod, and a use condition, corresponding to the use position and orientation of the support rod.

6 Claims, 4 Drawing Sheets



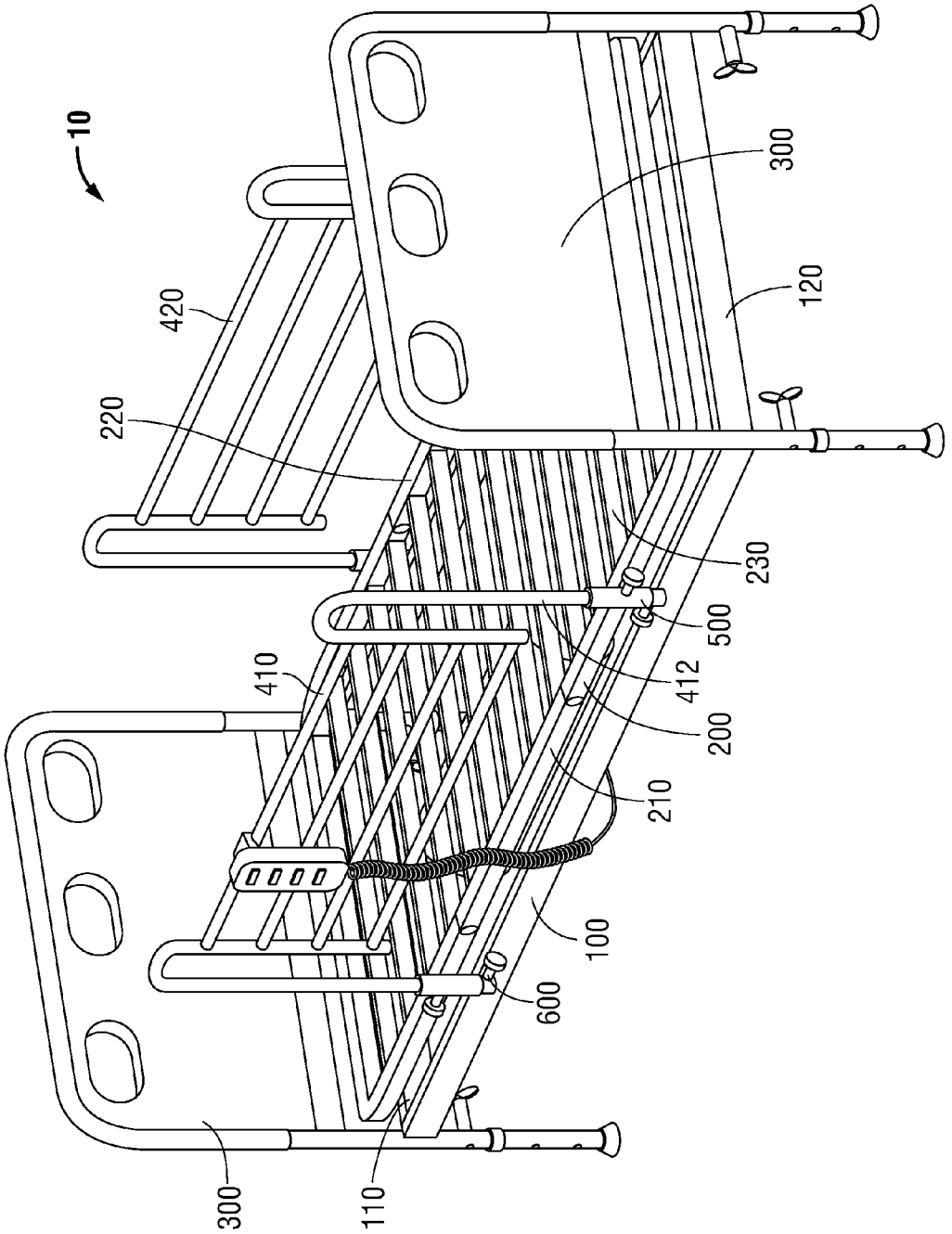


FIG. 1

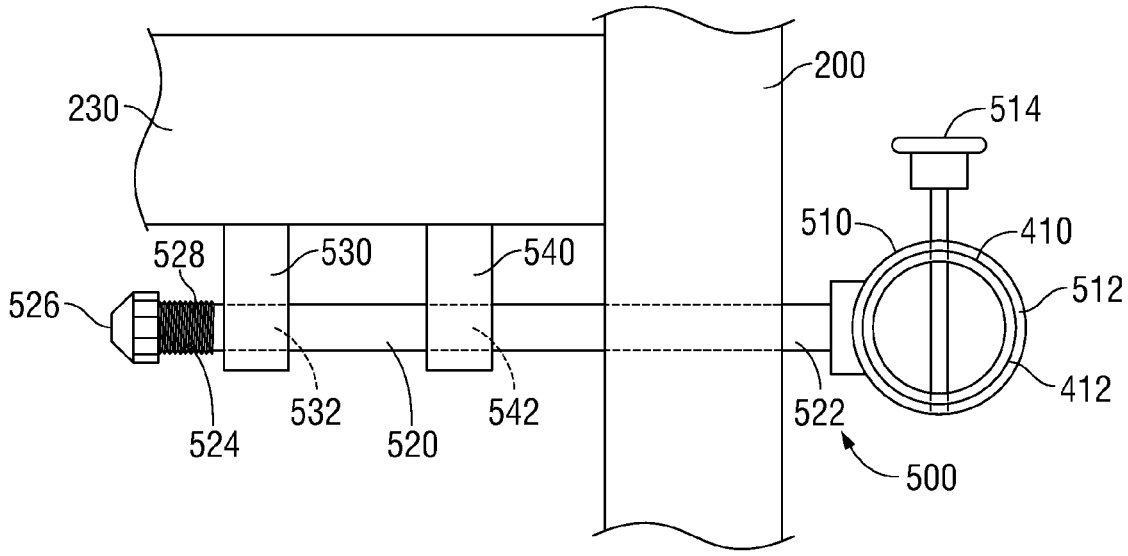

230
200
514
510
410
528
530
540
526
512
412
524
532
520
542
522
500

FIG. 2

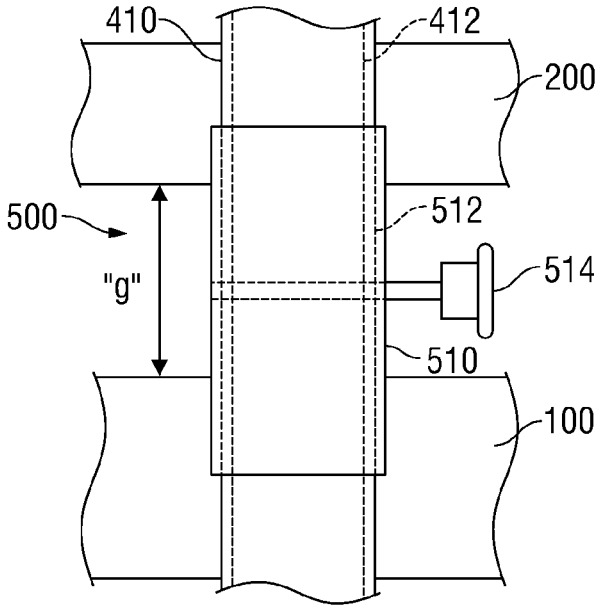

410
412
200
500
512
"g"
514
510
100

FIG. 3

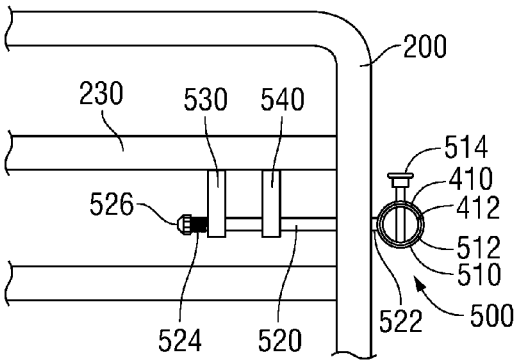


FIG. 4A

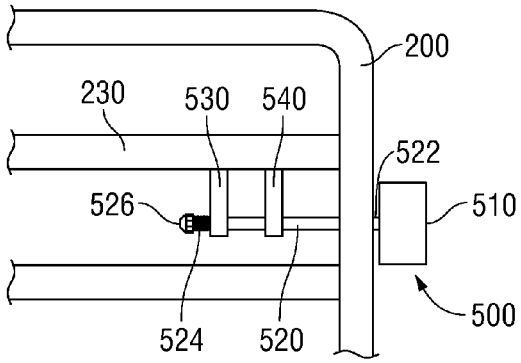


FIG. 4B

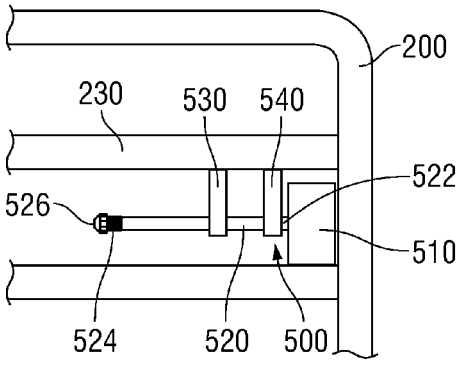


FIG. 4C

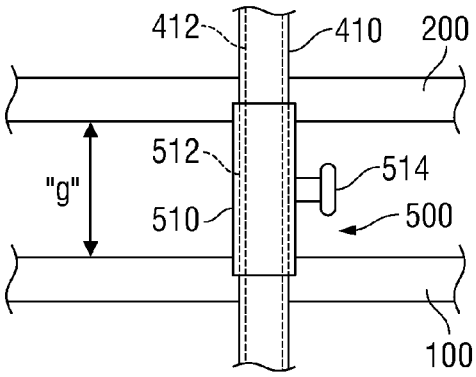


FIG. 5A

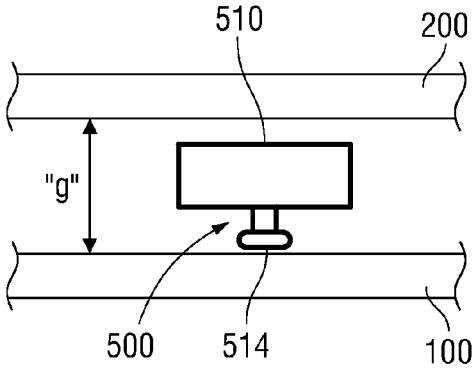


FIG. 5B

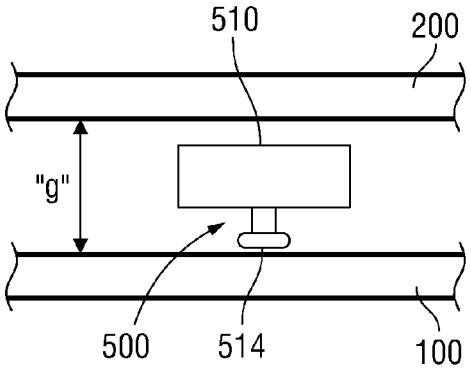


FIG. 5C

RETRACTABLE SIDE RAIL MOUNTING ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of, and priority to, U.S. Provisional Patent Application No. 61/550,005, filed on Oct. 21, 2011, the entire contents of which are hereby incorporated by reference herein.

BACKGROUND

1. Technical Field

The present disclosure relates to patient care beds, and more particularly, to a retractable side rail mounting assembly for use in a patient care bed.

2. Background of Related Art

Adjustable beds are used in both home care and in more formalized medical settings, e.g., hospital rooms. Adjustable beds generally include a fixed frame, adjustable leg assemblies supporting the fixed frame, and an articulating bed frame coupled to the fixed frame and configured to support a mattress thereon. The adjustable leg assemblies permit height adjustment of the fixed frame relative to the floor, while the articulating bed frame is selectively articulatable to orient the patient in a desired position, e.g., a lying position, a sitting position, etc. Thus, adjustable beds can be adapted for use in various different configurations, depending on the setting, e.g., home care or hospital, the condition of the patient, treatment protocol, or other factors.

In some instances, it is necessary to provide side rails on either or both sides of the bed. However, because not all situations call for either or both side rails, it is desirable that the side rails are easily installed and removed from the bed. With this in mind, mounting structures that extend outwardly from the bed frame, rather than being positioned underneath or within the bed frame, have been provided to facilitate the installation and removal of the side rails. Such mounting structures, although easily accessible, increase the dimensions of the bed, may interfere with a patient's ability to get into or out of the bed, and/or provide obstacles to others in the general vicinity of the bed.

SUMMARY

In accordance with the present disclosure, a patient care bed is provided. The patient care bed includes a frame, a side rail, and a side rail mounting assembly. The side rail mounting assembly includes a rail-receiving member and a support rod. The rail-receiving member defines a passageway extending therethrough that is configured to releasably receive at least a portion of the side rail to releasably couple the side rail to the frame. The support rod is fixedly engaged to and extends from the rail-receiving member. The support rod is slidably and rotatably coupled to the frame. More specifically, the support rod is slidable relative to the frame between a storage position, wherein the rail-receiving member is disposed within peripheral dimensions of the frame, and a use position, wherein the rail-receiving member is disposed outside the peripheral dimensions of the frame. The support rod is also rotatable relative to the frame between a storage orientation, wherein the rail-receiving member is horizontally oriented, and a use orientation, wherein the rail-receiving member is vertically oriented. Thus, the side rail mounting assembly is capable of being transitioned between a storage condition, corresponding to the storage position and storage orientation of the support rod, and a use condition, corresponding to the use position and use orientation of the support rod.

In embodiments, the frame includes at least one mounting flange configured to slidably and rotatably receive the support rod between first and second ends of the support rod.

In embodiments, the rail-receiving member is disposed at the first end of the support rod and a stop member is disposed at the second end of the support rod.

In embodiments, a biasing member is disposed about the support rod between the at least one mounting flange and the stop member to bias the support rod towards the storage position.

In embodiments, interference between the rail-receiving member and frame inhibits sliding of the support rod from the use position to the storage position when the support rod is oriented in the use orientation.

In embodiments, the rail-receiving member includes a spring pin configured to releasably engage the at least a portion of the side rail within the passageway of the rail-receiving member.

In embodiments, first and second side rails and a plurality of side rail mounting assemblies are provided. At least one side rail mounting assembly is configured to releasably couple the first side rail to a first side of the frame and at least another side rail mounting assembly is configured to releasably couple the second side rail to a second side of the frame.

A side rail mounting assembly provided in accordance with the present disclosure and configured for use with a patient care bed includes a rail-receiving member and a support rod. The rail-receiving member defines a passageway extending therethrough that is configured to releasably receive at least a portion of a side rail. The support rod is fixedly engaged to and extends from the rail-receiving member. The support rod is slidably and rotatably coupled to a frame of a patient care bed such that: the support rod is slidable relative to the frame between a storage position, wherein the rail-receiving member is disposed within peripheral dimensions of the frame, and a use position, wherein the rail-receiving member is disposed outside the peripheral dimensions of the frame; and the support rod is rotatable relative to the frame between a storage orientation, wherein the rail-receiving member is horizontally oriented, and a use orientation, wherein the rail-receiving member is vertically oriented. As such, the side rail mounting assembly is capable of transitioning between a storage condition, corresponding to the storage position and storage orientation of the support rod, and a use condition, corresponding to the use position and use orientation of the support rod.

In embodiments, the rail-receiving member is disposed at a first end of the support rod and a stop member is disposed at a second end of the support rod.

In embodiments, a biasing member is disposed about the support rod and is configured to bias the support rod towards the storage position.

In embodiments, the rail-receiving member includes a spring pin configured to releasably engage the at least a portion of the side rail within the passageway of the rail-receiving member.

A method of configuring a patient care bed provided in accordance with the present disclosure includes providing a patient care bed, e.g., similar to the patient care bed described herein, although other patient care beds may also be provided, and determining whether the patient care bed is to be used with a side rail or whether the patient care bed is to be used without a side rail. If it is determined that the patient care bed is to be used with a side rail, the side rail mounting assembly is transitioned to a use condition, wherein the rail-receiving

member is disposed outside peripheral dimensions of the frame and is disposed in a use orientation. On the other hand, if it is determined that the patient care bed is to be used without a side rail, the side rail mounting assembly is transitioned to a storage condition, wherein the rail-receiving member is disposed within the peripheral dimensions of the frame and is disposed in a storage orientation.

In embodiments, after transitioning the side rail mounting assembly to the use condition once it has been determined that the patient care bed is to be used with a side rail, the method may further including engaging a portion of a side rail within the passageway of the rail-receiving member.

In embodiments, transitioning the side rail mounting assembly to the use condition includes sliding the support rod relative to the frame such that the rail-receiving member is moved outside the peripheral dimensions of the frame and rotating the support rod relative to the frame such that the rail-receiving member is disposed in a vertical orientation.

In embodiments, transitioning the side rail mounting assembly to the storage condition includes rotating the support rod relative to the frame such that the rail-receiving member is disposed in a horizontal orientation and sliding the support rod relative to the frame such that the rail-receiving member is moved inside the peripheral dimensions of the frame.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments of the present disclosure are described with reference to the accompanying drawing figures, wherein:

FIG. **1** is a perspective view of one embodiment of an adjustable bed provided in accordance with the present disclosure;

FIG. **2** is a greatly enlarged, top view of the area of detail indicated in FIG. **1**, showing a side rail mounting assembly provided in accordance with the present disclosure;

FIG. **3** is a greatly enlarged, side view of the area of detail indicated in FIG. **1**, showing the side rail mounting assembly of FIG. **2**;

FIG. **4**A is a top view of a portion of a bed frame including the side rail mounting assembly of FIG. **2** coupled thereto and disposed in a use state;

FIG. **4**B is a top view of the portion of the bed frame including the side rail mounting assembly of FIG. **2** coupled thereto and transitioning between the use state and a storage state;

FIG. **4**C is a top view of the portion of the bed frame including the side rail mounting assembly of FIG. **2** coupled thereto and disposed in the storage state;

FIG. **5**A is a side view of the portion of the bed frame including the side rail mounting assembly of FIG. **2** coupled thereto and disposed in the use state;

FIG. **5**B is a side view of the portion of the bed frame including the side rail mounting assembly of FIG. **2** coupled thereto and transitioning between the use state and the storage state; and

FIG. **5**C is a side view of the portion of the bed frame including the side rail mounting assembly of FIG. **2** coupled thereto and disposed in the storage state.

DETAILED DESCRIPTION

Various exemplary embodiments of the presently disclosed subject matter will now be described in detail with reference to the drawings, wherein like references characters identify similar or identical elements.

Turning now to FIG. **1**, an adjustable bed system provided in accordance with embodiments of the present disclosure is shown generally identified by reference numeral **10**. Bed system **10** may find application in both hospital settings as well as in private home care settings. Bed system **10** generally includes a fixed frame **100**, an articulatable frame **200** articulatably mounted on fixed frame **100**, a pair of leg and end board assemblies **300** coupled to fixed frame **100** at either end **110**, **120** thereof, and first and second side rails **410**, **420** coupled to articulatable frame **200** and extending along first and second sides **210**, **220**, respectively, thereof. A first pair of retractable side rail mounting assemblies **500**, **600** couples first side rail **410** to first side **210** of articulatable frame **200** at two positions therealong. A second pair of retractable side rail mounting assemblies (not explicitly shown) likewise couples second side rail **420** to second side **220** of articulatable frame **200** at two positions therealong. However, it is also envisioned that greater than two positions for mounting side rails **410**, **420** to articulatable frame **200** be provided and/or that side rails **410**, **420** be mounted to fixed frame **100**, rather than articulatable frame **200**.

Turning now to FIGS. **2-3**, retractable side rail mounting assembly **500** is described. The first pair of side rail mounting assemblies **500**, **600** and the second pair of side rail mounting assemblies (not explicitly shown) are substantially similar to one another and, thus, only side rail mounting assembly **500** is described hereinbelow to avoid unnecessary repetition. Further, although side rail mounting assembly **500** is shown configured for use with bed system **10** and side rail **410**, it is envisioned that side rail mounting assembly **500** be configured for use with any suitable bed system and/or side rail.

With continued reference to FIGS. **2-3**, retractable side rail mounting assembly **500** generally includes a rail-receiving member, or cylinder **510** that is engaged, e.g., welded or otherwise secured, to a support rod **520** at an outer end **522** of support rod **520** in generally perpendicular relation relative to support rod **520**. Rail-receiving cylinder **510** includes a lumen **512** extending therethrough that is configured to receive a support post **412** of side rail **410** therein. Rail-receiving cylinder **510** may include a spring pin **514** coupled thereto and configured for engagement within an aperture (not explicitly shown) defined transversely through support post **412** of side rail **410** to retain support post **412** in fixed position within rail-receiving cylinder **510**. Alternatively, any other releasable engagement mechanism may be used to releasable secure support post **412** within rail-receiving cylinder **510**. Further, although shown as a cylinder configured to receive the complementary-shaped cylindrical support post **412**, it is envisioned that rail-receiving member **510** may alternatively define any other configuration suitable to receive a support post **412** of a side rail **410** therethrough.

Support rod **520** is slidably and rotatably coupled to articulatable frame **200** via a pair of mounting flanges **530**, **540**. Each mounting flange **530**, **540** is engaged, e.g., welded or otherwise secured to a crossbar **230** of articulatable frame **200**, and defines an aperture **532**, **542** extending transversely therethrough. Apertures **532**, **542** are configured to receive support rod **520** therethrough and to permit rotation and translation of support rod **520** relative to mounting flanges **530**, **540**. Support rod **520** further includes a cap, or nut **526** coupled thereto at inner end **524** thereof. Nut **526** inhibits support rod **520** from translating too far outwardly relative to mounting flanges **530**, **540**, thereby inhibiting withdrawal of support rod **520** from apertures **532**, **542** in the outward direction, e.g., away from articulatable frame **200**, while rail-receiving cylinder **510** inhibits support rod **520** from translating too far inwardly relative to mounting flanges **530**, **540**,

thereby inhibiting withdrawal of support rod **520** from apertures **532**, **542** in the inward direction, e.g., inwardly towards a longitudinal axis of articulatable frame **200**. That is, support rod **520** is translatable between an outward, extended, or use position, wherein nut **526** is positioned adjacent mounting flange **530** and wherein rail-receiving cylinder **510** extends outwardly from articulatable frame **200**; and an inward, retracted, or storage position, wherein rail-receiving cylinder **510** is positioned within the peripheral dimensions of articulatable frame **200** and adjacent mounting flange **540**. A spring **528** is disposed about support rod **520** between nut **526** and mounting flange **530** to bias support rod **520** towards the refracted, or storage position, although it is also envisioned that support rod **520** be biased towards the extended, or use position, or that support rod **520** be substantially unbiased.

As mentioned above, support rod **520** and, thus, rail-receiving cylinder **510**, are rotatable relative to mounting flanges **530**, **540** and, thus, relative to articulatable frame **200**. More specifically, support rod **520** and rail-receiving cylinder **510** are rotatable between a use orientation, wherein rail-receiving cylinder **510** is generally vertically oriented, substantially perpendicular to articulatable frame **200**; and a storage orientation, wherein rail-receiving cylinder **510** is generally horizontally oriented, substantially parallel to articulatable frame **200**. In the use orientation, the generally vertical position of rail-receiving cylinder **510** facilitates the engagement of support post **412** of side rail **410** therein. In the storage orientation, on the other hand, the lower profile of rail-receiving cylinder **510** facilitates the translation of support rod **520** between the extended, or use position and refracted, or storage position.

Turning now to FIGS. **4**A-**4**C and **5**A-**5**C, the use and operation of side rail mounting assembly **500** is described. Additional features of side rail mounting assembly **500** will become apparent in view of the following.

With initial reference to FIGS. **4**A and **5**A, side rail mounting assembly **500** is shown disposed in a use state, wherein support rod **520** and rail-receiving cylinder **510** are disposed in the use position and the use orientation. That is, in the use state, support rod **520** is positioned such that rail-receiving cylinder **510** extends outwardly from articulatable frame **200** (e.g., the extended position) and such that rail-receiving cylinder **510** is generally vertically oriented, substantially perpendicular to articulatable frame **200** (e.g., the use orientation). With support rod **520** and rail-receiving cylinder **510** in the use orientation, rail-receiving cylinder **510** extends upwardly to at least partially intersect the plane defined by articulatable frame **200**. Thus, retraction of support rod **520** is inhibited in that rail-receiving cylinder **510** will eventually contact the outer, side surface of articulatable frame **200**, thereby inhibiting further retraction of support rod **520**. Put more generally, rail-receiving cylinder **510**, in the use orientation, inhibits support rod **520** from returning under bias back to the retracted, or storage position.

Continuing with reference to FIGS. **4**A and **5**A, with side rail mounting assembly **500** disposed in the use state, support post **412** of side rail **410** may be inserted into lumen **512** of rail-receiving cylinder **510** and may be secured therein at a desired height by the engagement of spring pin **514** within an aperture (not explicitly shown) extending therethrough. In other words, in the use state, side rail **410** may be easily engaged within side rail mounting assembly **500** to secure side rail **410** to articulatable frame **200**.

Turning now to FIGS. **4**B-**4**C and **5**B-**5**C, if side rail **410** is not being used, side rail mounting assembly **500** may be transitioned to a storage state, wherein side rail mounting assembly **500** is out of the way of patients, clinicians, or others in the general vicinity of bed system **10**. In order to transition side rail mounting assembly **500** from the use state (FIGS. **4**A and **5**A) to the storage state (FIGS. **4**C and **5**C), as shown in FIGS. **4**B and **5**B, support rod **520** is first rotated from the use orientation to the storage orientation. In the storage orientation, rail-receiving cylinder **510** defines a reduced profile, no longer intersecting the plane defined by articulatable frame **200**. That is, in the storage orientation, rail-receiving cylinder **510** no longer inhibits support rod **520** from returning under bias back to the retracted or storage position.

Referring now to FIGS. **4**C and **5**C, once rail-receiving cylinder **510** is rotated to the storage orientation, support rod **520** is returned under bias back towards the retracted, or storage position, wherein rail-receiving cylinder **510** passes through the gap "g" defined between articulatable frame **200** and fixed frame **100** to the storage state, wherein rail-receiving cylinder **510** is positioned within the peripheral dimensions of articulatable frame **200** and adjacent mounting flange **540**. Alternatively, in embodiments where support rod **520** is not biased towards the retracted, or storage position, support rod **520** may simply be slid inwardly to the retracted, or storage position. Further, in some embodiments, a slot (not explicitly shown) may be defined within articulatable frame **200** and/or fixed frame **100** to facilitate passage of rail-receiving cylinder **510** therebetween.

With reference to FIGS. **4**A-**4**C and **5**A-**5**C, in order to return side rail mounting assembly **500** to the use position, with rail-receiving cylinder **510** disposed in the storage orientation, support rod **520** is slid, or translated outwardly relative to articulatable frame **200** from the retracted position towards the extended position such that rail-receiving cylinder **510** passes through the gap "g" defined between articulatable frame **200** and fixed frame **100** to a position externally thereof. Once rail-receiving cylinder **510** is clear, i.e., externally disposed, relative to articulatable frame **200**, rail-receiving cylinder **510** and support rod **520** may be rotated back to the use orientation to retain side rail mounting assembly **500** in the use position, wherein rail-receiving cylinder **510** is presented to facilitate engagement of side rail **410** thereto.

The above description, disclosure, and figures should not be construed as limiting, but merely as exemplary of particular embodiments. It is to be understood, therefore, that the disclosure is not limited to the precise embodiments described, and that various other changes and modifications may be effected by one skilled in the art without departing from the scope or spirit of the present disclosure. Additionally, persons skilled in the art will appreciate that the features illustrated or described in connection with one embodiment may be combined with those of another, and that such modifications and variations are also intended to be included within the scope of the present disclosure. Therefore, the above description should not be construed as limiting, but merely as exemplifications of particular embodiments.

What is claimed is:

1. A patient care bed, comprising:

a frame defining first and second opposed ends and first and second sides opposed sides; a side rail; and

a side rail mounting assembly coupled to the frame, the side rail mounting assembly including:

a rail-receiving member defining a passageway extending therethrough that is configured to releasably receive at least a portion of the side rail to releasably couple the side rail to the frame adjacent the first or second sides thereof; and

a support rod defining a longitudinal axis and being fixedly engaged to and extending from the rail-receiv-

ing member, the support rod slidably and rotatably coupled to the frame, the support rod slidable relative to the frame along the longitudinal axis between a storage position, wherein the rail-receiving member is disposed within peripheral dimensions of the frame, and a use position, wherein the rail-receiving member is disposed outside the peripheral dimensions of the frame, the support rod rotatable relative to the frame about the longitudinal axis between a storage orientation, wherein the rail-receiving member is horizontally oriented, and a use orientation, wherein the rail-receiving member is vertically oriented,

wherein the side rail mounting assembly is transitionable between a storage condition, corresponding to the storage position and storage orientation of the support rod, and a use condition, corresponding to the use position and use orientation of the support rod,

wherein the frame includes at least one mounting flange configured to slidably and rotatably receive the support rod between first and second ends opposing terminal ends of the support rod,

wherein the rail-receiving member is disposed at the first end of the support rod and wherein a stop member is disposed at the second end of the support rod; further comprising a biasing member disposed about and surrounding the support rod between the at least one mounting flange and the stop member to bias the support rod towards the storage position.

2. The patient card bed according to claim **1**, wherein interference between the rail-receiving member and frame inhibits sliding of the support rod from the use position to the storage position when the support rod is oriented in the use orientation.

3. The patient care bed according to claim **1**, wherein the rail-receiving member includes a spring pin configured to releasably engage the at least a portion of the side rail within the passageway of the rail-receiving member.

4. The patient care bed according to claim **1**, further comprising first and second side rails and a plurality of side rail mounting assemblies, at least one side rail mounting assembly configured to releasably couple the first side rail to the first side of the frame and at least another side rail mounting assembly configured to releasably couple the second side rail to the second side of the frame.

5. A side rail mounting assembly for use with a patient care bed, the side rail mounting assembly comprising:

a rail-receiving member defining a passageway extending therethrough that is configured to releasably receive at least a portion of a side rail; and

a support rod fixedly engaged to and extending from the rail-receiving member, the support rod defining a longitudinal axis, the support rod slidably and rotatably coupled to a frame of a patient care bed, the support rod slidable along the longitudinal axis and relative to the frame between a storage position, wherein the rail-receiving member is disposed within peripheral dimensions of the frame, and a use position, wherein the rail-receiving member is disposed outside the peripheral dimensions of the frame, the support rod rotatable about the longitudinal axis and relative to the frame between a storage orientation, wherein the rail-receiving member is horizontally oriented, and a use orientation, wherein the rail-receiving member is vertically oriented,

wherein the side rail mounting assembly is transitionable between a storage condition, corresponding to the storage position and storage orientation of the support rod, and a use condition, corresponding to the use position and use orientation of the support rod,

wherein the frame includes at least one mounting flange configured to slidably and rotatably receive the support rod between first and second ends opposing terminal ends of the support rod,

wherein the rail-receiving member is disposed at the first end of the support rod and wherein a stop member is disposed at the second end of the support rod; further comprising a biasing member disposed about and surrounding the support rod between the at least one mounting flange and the stop member to bias the support rod towards the storage position.

6. The side rail mounting assembly according to claim **5**, wherein the rail-receiving member includes a spring pin configured to releasably engage the at least a portion of the side rail within the passageway of the rail-receiving member.

* * * * *